

CLAIMS

What is claimed is:

1. A wheel differential, comprising:

a differential housing;

a differential cage rotatably supported on said differential housing by a set of bearings;

a clutch assembly having a first member fixed to said differential cage and a second member configured to receive an axle half shaft extending from said differential cage for rotation with said axle half shaft; and,

a shift chamber disposed radially outwardly of an outer race member of said set of bearings;

a piston disposed within said shift chamber;

a pushrod coupled to said piston; and,

a shift arm coupled to said pushrod and configured to engage said second member of said clutch assembly.

2. The differential of claim 1, further comprising a spring that biases said piston in a first direction.

3. The differential of claim 2 wherein said spring comprises a wave spring.

4. The differential of claim 2 wherein a fluid force selectively urges said piston in a second direction, opposite said first direction.

5. The differential of claim 1 wherein said piston is urged in a first direction by a first fluid force and said piston is urged in a second direction, opposite said first direction, by a second fluid force.

6. The differential of claim 1 wherein said pushrod includes a flat and said shift chamber includes a support plate having an aperture with a corresponding flat, said aperture configured to receive said pushrod.

7. A wheel differential, comprising:

a differential housing;

a differential cage rotatably supported on said differential housing by a set of bearings;

a bearing cap coupled to said differential housing and disposed about at least a portion of said set of bearings;

a clutch assembly having a first member fixed to said differential cage and a second member configured to receive an axle half shaft extending from said differential cage for rotation with said axle half shaft; and,

a differential lock assembly including:

a shift chamber formed in said bearing cap;

a piston disposed within said piston; and,

a shift arm coupled to said pushrod and configured to engage said second member of said clutch assembly.

8. The differential of claim 7, further comprising a spring that biases said piston in a first direction.

9. The differential of claim 8 wherein said spring comprises a wave spring.

10. The differential of claim 8 wherein a fluid force selectively urges said piston in a second direction, opposite said first direction.

11. The differential of claim 7 wherein said piston is urged in a first direction by a first fluid force and said piston is urged in a second direction, opposite said first direction, by a second fluid force.

12. The differential of claim 7 wherein said pushrod includes a flat and said shift chamber includes a support plate having an aperture with a corresponding flat, said aperture configured to receive said pushrod.

13. The differential of claim 7 wherein said bearing cap defines an arcuate recess and shift chamber is arcuately centered relative to said recess.

14. A wheel differential, comprising;

- a differential housing;
- a differential cage rotatably supported on said differential housing by a set of bearings;
- a ring gear coupled to said differential cage for rotation therewith;
- a drive pinion in mesh with said ring gear and having an axis of rotation;
- a clutch assembly having a first member fixed to said differential cage and a second member configured to receive an axle half shaft extending from said differential cage for rotation with said axle half shaft; and,
- a differential lock assembly including:
 - a shift chamber disposed radially outwardly of an outer race member of said set of bearings;
 - a piston disposed within said shift chamber;
 - a pushrod coupled to said pushrod; and,
 - a shift arm coupled to said pushrod and configured to engage said second member of said clutch assembly;

wherein said differential lock assembly and said ring gear are located on the same side of said axis of rotation of said drive pinion.

15. The differential of claim 14, further comprising a spring that biases said piston in a first direction.

16. The differential of claim 15 wherein said spring comprises a wave spring.
17. The differential of claim 15 wherein a fluid force selectively urges said piston in a second direction, opposite said first direction.
18. The differential of claim 15 wherein said piston is urged in a first direction by a first fluid force and said piston is urged in a second direction, opposite said first direction, by a second fluid force.
19. The differential of claim 14 wherein said pushrod includes a flat and said shift chamber includes a support plate having an aperture with a corresponding flat, said aperture configured to receive said pushrod.
20. The differential of claim 14, further comprising a bearing cap coupled to said differential housing and disposed about at least a portion of said set of bearings, said shift chamber formed in said bearing cap.